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This paper, prepared for delivery at the 1961 Nebraska Symposium on Motivation, discusses research designed to determine whether selected motives (affiliation, power, and achievement) affect learning in different classroom situations. The author concludes that the findings support the idea that teaching methods interact with student motives in determining the outcomes of education. He also offers the conviction, strengthened by the results of this research, that much greater use of multivariate analysis is needed in research in this area. Includes 33 bibliographic references.

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Motivation, Teaching Methods, and College Learning[1]

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The quest for the Golden Fleece was no more arduous than the quest for measures predicting academic achievement. Almost from their inception intelligence and achievement tests proved to have significant correlations with criteria of college success, but these correlations seldom exceeded .5. Almost everyone has been agreed that individual differences in motivation are responsible for much of the remaining variance in college grades. Considering the effort devoted to the prediction of college success, it is astonishing that we still have no measure of motivation which has proved generally useful for college admissions officers.

Previous research on the relative effectiveness of differing college teaching methods has also produced scanty results. Experiments on lecture vs. discussion, large vs. small classes, and television vs. live instruction have produced worthwhile evidence but are still not conclusive. (McKeachie, 1961.)

One possible partial explanation for the meager findings in both these areas is that teaching methods affect different students differently. Students who profit from one method may do poorly in another while other students may do poorly in the first method and well in the second. When we average them together we find no overall difference between methods.

The practical problems of predicting academic achievement and identifying effective teaching methods are not alone in pointing to the importance of studying interactions between student characteristics and teaching methods. There are also good theoretical reasons for looking at such interactions.

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1. Draft of a paper to be delivered at the 1961 Nebraska Symposium on Motivation.

ED000764

Cronbach (1957) has cogently argued for the values of combining experimental and correlational approaches in studying behavior. His arguments for the study of interactions of general psychological and personality variables are just as forceful when extended to the more molar level of interactions between personality and social psychological variables. In fact, Cronbach himself draws examples from education of the potential value of a combined experimental and correlational approach.

In addition to the arguments from the levels of practical necessity and theoretical exigency an intermediate level of argument may be adduced. I would argue in extension of Cronbach's thesis that even though education research needs both more basic research and more applied research, its greatest present need is for research which tests out theoretical concepts and relationships in a naturalistic setting. If we attempt to apply any current behavior theory to education, we find that the gap between theory and educational practice is so great that educators can draw no clear implications from behavior theory. This is not the fault of the behavior theorist. They are quite right, I think, in studying whatever interests them, working in relatively simple, pure situations. (See Spence, 1959.) Even in these situations, the task of developing comprehensive theories and establishing quantitative laws is difficult enough to absorb all of the energy and talent available. To ask the behavior theorist to work out the applications of his theories is simply to draw him away from his central task. Nevertheless we do need researchers who with understanding of behavior theory undertake research in complex natural situations. Such research almost inevitably will need to find ways of categorizing or dimensionalizing situations, will need to establish which individual difference dimensions are most useful in determining the parameters of the learning theorists' curves, and will need to develop a

taxonomy of types of learning.

I believe that research in this middle area may help both the theoretician and the practitioner. Such research must almost inevitably deal with interactions between situational and individual characteristics, and thus I deliberately chose not to call this contribution "Motivation and College Learning" or "Teaching Methods and College Learning" but rather "Motivation, Teaching Methods, and College Learning."

When one enters this middle ground of naturalistic research, it is immediately apparent that the formulae of the behavior theorists must be greatly expanded and that one cannot study all the possible variables affecting behavior. What dimensions are likely to be most useful to investigate? What should our independent variables be?

As a social psychologist, my thought first turned to social psychological variables as a starting point. Unfortunately I know of no social psychological theory which specifies the basic dimensions of groups and provides measures of them. Cattell (1948) has discussed a dimension he calls "group syntality" which includes a number of measures of group effectiveness and of characteristics of group members; group dynamics researchers have talked about dimensions like group cohesiveness (Cartwright and Zander 1960); other theoreticians have suggested other variables. But none of these theories says much about how individuals differ in their behavior in a group which possesses a given amount of syntality, cohesiveness, or other characteristics. In most of these systems group members can be represented as empty circles indistinguishable from one another except for the roles individuals may fill for the group.

Turning from social psychological variables to personality variables, I encountered much the same difficulties. Despite heroic efforts to determine basic dimensions of personality, personality researchers seem in little agreement about

what these dimensions are and in many cases even after a trait or dimension has been identified there is little sure knowledge about what types of situations elicit this trait.

After considering a number of such alternatives, I settled on the approach taken by McClelland, Atkinson, Heyns, Veroff and others (Atkinson 1958) in developing theory and measures which take account not only of individual differences in achievement, affiliation and power motivation but also of the situational cues which elicit these motives.

But motives and situational cues are not the only variables needed in predictions of college behavior. To place them in perspective, let me briefly sketch my conception of the major sources of variance in college achievement. [2]

I would begin with the student. Students enter college with a number of important, relatively stable motives learned at home, in their previous educational experiences, and through other experiences. There are not only individual differences in these motives but also differences in the relative strength of different motives within individuals. They also possess skills and abilities useful in achieving goals in college. Some of these, such as verbal ability, are measured by the intelligence tests given for admission; others like reading ability, note-taking skill, study habits, ability to gain the instructor's sympathy, and ability to make friends, are not measured in our entrance battery. Unfortunately for my sort of research, there is a motivational factor of major importance common to all classes and students - grades. Whatever his motives for attending college, a student is motivated for grades.

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2. John W. Atkinson and Yi-Guang Lin have given me useful suggestions for this conceptualization but should not be held responsible for the use to which their ideas have been put.

At the very least, he must maintain a high enough average to remain in college and in most cases his access to vocational or other goals depends to some extent upon achievement of higher grades. This is probably particularly true at Michigan where we have a student body highly selected on the basis of high school grades, with relatively few students anticipating inheritance of positions resulting from the family fortune, and with a social climate emphasizing academic achievement. Because most students are highly motivated for grades, the differential effects of differing teaching methods in eliciting such motives as need for achievement, need for affiliation, and need for power are difficult to detect. Nevertheless, if everyone were motivated equally we might expect the correlation between ability measures and grades to be much higher than it is. Even the best combinations of measures of ability and criterion measures leave a good deal of variance unaccounted for - enough at least to leave hope that motivational measures may contribute significantly.

The total college environment has much to do with activating these motives and skills. As Pace and Stern (1958) have shown, colleges differ markedly in their students' perceptions of what are important goals and appropriate instrumental behaviors to attain these goals. I suspect that Pace and Stern could also show from their data that there is an interaction at this level; i.e., students' own motives and skills influence their perception of the important cues in the college environment. Thus for Student A, the college environment may seem to present compelling cues for expectations of satisfaction from academic achievement and the use of skills in studying, while Student B in the same college perceives cues to expectation of satisfaction from extracurricular leadership achieved by using skills in making friends and conscientious

fulfillment of social obligations.

In addition to such general expectations the student develops specific expectations about the likely satisfactions and appropriate instrumental behaviors in his college classes. The cues provided by his instructors thus may activate motives or skills which have previously been latent, may maintain the activation of motives or skills already active, may frustrate expectations previously elicited by the total environment, or may arouse uncertainty and anxiety about the likelihood of success or failure in reaching his goals.

The discussion this far probably implies my solution to the problem of identifying important social psychological or situational dimensions. This, of course, was also the problem which concerned Rotter in the 1955 Nebraska Symposium. (Rotter 1955). My solution to the problem was an indirect one. The steps were simply to choose apparently important human motives and then to categorize situations in terms of the cues they provide for activating these motives. This seems to me to be virtually the same technique as that used by Rotter except that my categorization is based upon the measures and research of the McClelland-Atkinson groups. I would, however, go beyond Rotter in suggesting that situations might also be usefully categorized in terms of their relevance for eliciting individual differences other than in motivation. For example, we might also categorize situations in terms of their relevance for individual differences in abilities, habits, or defense mechanisms.

So we have the student in a class in which cues to motive satisfaction and to pathways to the goal are present. What happens next?

Here our mode of discourse is misleading, for I must present in sequence several processes which are in fact proceeding simultaneously. At the same time that the individual's motives are being activated, he is choosing a strategy,[3] such as maximizing satisfaction or minimizing regret. Since the student is involved in several courses as well as in extra-curricular, social, and other activities, his strategy must involve assessment of the potential rewards and punishments and probabilities of attainment in all of these situations. Whatever his strategy, its choice involves an assessment of his habits and skills in relation to both the possible satisfactions in the situation and to the types of behavior necessary to achieve these satisfactions. From this assessment comes an estimate of the amount and kind of likely satisfaction and the probability of attaining it in each class. This combination of subjective expectancies of affect and of probability of affect is what I call motivation.[4]

The individual's habits and skills thus enter into motivation in determining subjective probability, or as Atkinson terms it "incentive". But they also enter into predictions of achievement again in their own right, for if we are to predict a grade we must assess the instrumental habits used by the student to achieve his goals as well as his skill in their use.

Let me illustrate this by an example. Let us suppose that we have a student who has a strong achievement motive in a classroom in which the teacher provides cues to standards of achievement and incentives for achievement. This arouses expectancies of achievement satisfaction for the student but the strength of his motivation will also be influenced by his estimate of the chances of achieving the standards set by the instructor. Atkinson (1958) has suggested

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3. The words "choice" and "strategy" imply a much greater degree of consciousness and rationality than I wish. Clearly much of the process is unconscious and intuitive.
4. I use "motive" to refer to the stable tendency to receive satisfaction from attaining a class of goals and "motivation" to refer to the strength of the tendency to strive for a particular goal at a particular time.

that motivation for achievement will be highest when subjective probability is moderate; i.e. when the uncertainty of the outcome is at its maximum.[5] Two students with strong achievement motives may select the same instrumental habits to achieve their goals; e.g. they may both do their homework,but if they differ in subjective probability of success, their motivation will differ and we may expect differences in attentiveness, persistence and ultimately in achievement. Similarly two students may both have strong achievement motives and both have the same expectancies of success, yet they may differ in the instrumental habits they choose to attain success or in the skill with which they actually perform the instrumental responses chosen,and these differences may be reflected in their ultimate achievement.

The individual's habits and skills probably also enter our equation in a third term. In discussing the first variable, the college environment, I suggested that the total environment develops motivational and instrumental expectancies which the student brings into the classroom. It is easy to see that frustration is likely to be created when the student finds that his expected satisfactions are not likely to be gained in a particular class. The announcement of an especially rigorous grading policy is almost invariably greeted with groans of dismay and an upsurge in frustration instigated behavior. But the instructor who blocks or de-emphasizes such usual instrumental responses as note taking, memorizing a given textbook, answering specific factual test items is likely to encounter even stronger resistance. It may simply be that the instructor who emphasizes different instrumental responses produces frustration because he is lowering student's subjective probability of success; it may be that frustration results because one's well-learned habits come to have secondary motivational values in themselves; or it may be that any marked change

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5. Although Atkinson has made his case only for achiemement motivation, it is not improbable that a similar interaction might hold,for other motives. In fact, if it does not hold it is pitiful to think of all the coyness that has been wasted by the folklore that man's ardor is enhanced by uncertainty.

in expectancy is unpleasant. In any case, habit-skill expectancies enter into frustration, and frustration in turn may have certain responses associated with it which interfere with responses instrumental to learning.

At this point we have the student doing homework, taking lecture notes, making friends with the coed in the next seat or performing other instrumental responses. If we were to stop right here, we would have research problems of sufficient complexity to keep us busy for years to come. (And now that I've made this analysis, I wish we'd at least done some preliminary research at this level.) But we have chosen as our dependent variables educational achievements, such as those summarized in course grades, and this means that there are several remaining possible slips between the cup and the lip.

For one thing, you will note that I have not yet considered learning in our equation. We have the student studying, listening to lectures, or participating in discussions, but how much these activities contribute to his learning will presumably depend upon such things as the distribution of trials, the pattern of reinforcements, the timing and amount of feedback, the relationship of the elements presented to one another, and the size of gaps between one step and the next. These add up to pointing to the importance of the skill of the teacher in programming the course to achieve his objectives. Once again, moreover, we must consider the probability that an effective learning program for some students may not be equally effective for others.

It is also important to note that since we are trying to assess the learning in an entire course, students' choice of instrumental behaviors and the motives which are activated are likely to change as a result of feedback received during the course. The teacher's behavior is important not only in the initial cues it provides to motives and habits, but also in the continuous shaping of instrumental responses and motives of students which goes on in addition to the type of learning assessed in course examinations.

considered
By this point I hope we have/the major classes of variables affecting the college student's learning, but we still have to assess that learning, and this introduces another set of variables. Obviously I should point to the technical problems of test construction, but I won't. Only briefly will I mention that teaching effective for one level of learning may not be effective in achieving other desirable outcomes. (e.g. see McKeachie, 1959). But even more troublesome is the fact that all of the types of variables affecting the student's behavior in learning during the course also affect his behavior in the evaluation situation. Typically we use the course grade or the final examination as our principal criterion measure. Entering into the student's performance on the examination is not only his knowledge or other learning ostensibly assessed by the examination but also his motivation in the testing situation and his skills in taking examinations. One of the really oppressive thoughts which worries me is that some variable may work in opposite ways in the learning and examination situations. For example, students with a given level of anxiety about achievement might learn well, but in the examination situation, the cues to failure might be so great as to cause these students' performance to be disrupted. If we are really interested in learning, we would miss the importance of this variable. This is the sort of thing which leads me to look for multiple criterion measures, but this then introduces further problems of classification and relating.

One of the annoying things about naturalistic research is that the researcher typically lists so many variables that the reader or auditor leaves the field in confusion. I had thought that I might draw a diagram with arrows indicating interactions, but the arrows become so thick that I ran for cover and will simply try to list the categories of variables to which I have referred and to indicate the sorts of combinations I consider particularly important.

Figure 1.

Classes of Variables Interacting in Determining Achievement in a College Course

Environment	Immediate Situation	Student	Teacher	Achievement Test
College	Classroom cues	Motives Habits Skills	Patterning of reinforcements. Amount of feedback. Timing of feedback. Organization of content, etc.	1. Technical qualities. 2. Problem of multiple criteria with low or negative correlations. 3. Student motives and skills.

College and Classroom cues X Motives X Habits = Motivation (& Frustration).

Motivation X Habits = Learning behaviors (e.g. studying, attending class).

Motivation X Learning Behaviors X Teacher programming = Learning.

Learning X Motivation X Test taking skills = Measured Achievement.

The discouraging thing about such an analysis is that one obviously can't study all of the possible interactions. What does one do? Well, he just jumps in at the points he thinks are most likely to be critical and does his best with what he can handle. As I've already indicated, I jumped into student motives and classroom cues and while I've obtained measures in some of the other areas, I haven't tried to include them in my major analyses. Basically then, my work is an investigation of college student achievement as affected by the interaction between classes of cues found in college classrooms and the motives popularized by McClelland, Atkinson, and associates.

Now let me be more specific about how I try to work on these problems in an academic setting.[6]

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6. This research has been supported by grants from the Fund for Advancement of Education, Lilly Endowment, and U.S. Office of Education.

Hypotheses

Because our hypotheses about the affiliation motive are somewhat less complicated than our hypotheses about achievement motivation, I shall describe out procedures and results relevant to the affiliation motive before discussing our work on the power and achievement motives.

Basically our hypotheses have been of this form:

> The academic achievement of students high in affiliation motivation will be relatively higher in classes high in affiliative cues than in classes with few affiliative cues while the achievement of students low in affiliation motivation will be relatively lower in classes high in affiliative cues than in classes with few affiliative cues.

Similar hypotheses may be stated for the criteria of student satisfaction and attitude change.

Let me review our general thinking using the affiliation motive as an example. We began by assuming that the affiliation motive is an important dimension of individual differences in college students. Classes differ in the extent to which they provide cues for this motive. Some instructors are warm, friendly, personally interested in each student; other instructors are subject or self-oriented and elicit few expectations of affiliative satisfactions.

At this point, however, there is a gap in our theory of which I only gradually became aware. Our hypothesis assumes that students motivated to seek affiliative satisfaction in a class will achieve more than they would if no affiliative motivation were elicited. This fails to take account of the possibility that the teacher may not be the primary source of affiliative satisfaction. In fact one might expect affiliative satisfactions from other students to be more important than those from the instructor.

The second gap is that even when a student wants to win affiliative satisfaction from the teacher we are not sure that he will perceive academic achievement as being instrumental to such satisfactions. Quite conceivably, he might perceive apple polishing, asking questions or other behaviors as instrumental responses with a greater probability of arriving at his goal of affiliative satisfaction. Presumably his choice of these alternatives depends not only upon his own skills, but also upon constraints in the situation which reduce the probability of goal attainment for some alternatives.

Procedures:

To test our hypotheses we[7] needed a sample of students differing in motivation and a sample of instructors differing in the cues emitted. Since we were primarily concerned as a dependent variable with relative achievement within a class, it would have been possible to use a number of sections of different courses. There were, however, some advantages to having several teachers trying to achieve the same goals, since this permitted us to compare over-all effects of differing methods. At the same time, however, there were clear advantages for generalization if conclusions could be based upon more than one course. Consequently we chose three multi-section courses representing quite different types of content and objectives. They were second year French, freshman mathematics, and general psychology. Thirty-one instructors participated--all of the experienced teachers in these courses.

Measures:

Within these instructors' sections all students were invited to take a group of tests designed to measure our independent variables. In psychology, the time spent was credited as fulfilling the requirement that each student

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7. "We" here refers to Katherine Koenig, Anthony Kallet, Steven and Rae Kaplan, and David Cross, the students who worked with me on the project described in the following section. Also working with me were Roland Tharp and Jane Katherine Collins.

participate in a psychological experiment. As a result almost every student participated. In Frence and mathematics, we had less power but secceeded in testing some 80% of the men and 90% of the women. Of the 825 students in the three courses, 609 gave us complete usable responses on all tests. In our sample, there were 208 students in French, 188 in mathematics, and 218 in psychology. Two hundred and fifty-four were men; three hundred and fifty-five were women.

Motivation and Ability:

Our primary measure of motivation was the thematic apperception measure of achievement, affiliation, and power motivation described by Atkinson (1958). The pictures used were those used in the national survey of mental health by Veroff, Atkinson, Feld, and Gurin (1960). Our measure of anxiety was a questionnaire developed and used successfully at Stanford by Alpert and Haber (1960). As a measure of ability we used the scores on the American Council on Education Psychological Examination (1949 Form) which students had taken upon entering the University. We also developed measures of student expectations upon entering the course, of perceived instrumentality, of social class, religious background, and of other variables. None of these/latter measures were included in the analyses to be reported here.

Methods:

Our other independent variables were teaching methods. The most elegant design would have been to have each teacher teaching several classes, each of which was taught by a method specified to represent certain points on the dimensions we were studying. Since most instructors were teaching only one section, this wasn't possible, and even if it were, my previous experience with such manipulations has not been completely satisfying. There are a number of design problems which can not be solved by asking teachers to modify

their behavior. For example, there is the problem of whether teachers can teach different sections of the same course by different methods and use each method adequately. In some cases efforts to force differentiation may result in such self-consciousness and artificality that neither method is adequately represented. Another problem is that of Hawthorne (or reverse Hawthorne) effects created when students know that they are being experimented on. In any case, we simply let our instructors teach as they ordinarily would and used observers to place them on our dimensions.

We had two observers in each class. One of the observers used a modification of Bales' system of recording interactions. (Mann 1959) This system records each act in one of several categories. We collapsed some categories which were rare or unimportant in classroom observation. Rather than recording each student's acts separately, we treated the classroom as a two-person group made up of a teacher and students. We thus had student and teacher responses classified into eight categories:

1. Positive reactions.
2. Tension release.
3. Suggestions.
4. Orientation-opinion.
5. Asking for orientation or opinion.
6. Asking for support.
7. Tension.
8. Negative reactions.

The second observer was asked to look for behaviors which we expected to be particularly relevant for the motives we were studying. This observer thus noted such things as whether the instructor called students by name, students remained to chat with the instructor after class, the instructor

summarized the day's material at the end of the period, etc. In addition, he noted instances of tardiness and leaving class before the end of the period.

Classes were normally observed three times by each observer.

Our third and most important source of information about classroom process was the student himself. Each student completed a 12-item questionnaire about characteristics of the classroom. This questionnaire contained the three items with the highest factor loadings on each of four factors emerging from a factor analysis of a longer questionnaire. The four factors had to do with achievement cues, friendliness, organization of the content of the course,and structure of testing and grading.

Teacher Perception and Motivation

A third group of independent variables were involved in our investigation but are of only indirect relevance to the work I will report in this paper. These variables included instructor motives, values, and instrumental preferences. To assess these we interviewed each instructor for two hours asking him about his career goals, his aims in teaching and his judgment about the importance of the various teacher behaviors included in our questionnaire

In addition, each instructor was given a modification of Elizabeth French's Test of Insight which was scored for achievement, affiliation, and power motivation.

Outcome Measures

We had three types of outcome measures. The most obvious one was the course grade. A second measure was the student's satisfaction, which was assessed by a questionnaire which may be summarized by quoting the last question: "Rate the contribution of this course to your education." On the scale below this item, 1 was superior,2-very good, and so on to 5-poor. The third class of outcome measures included attitude scales--Thurstone type measures of attitudes toward language, mathematics, mental illness, and psychology.

Methods of Analysis

Our results were analyzed using Lancaster's technique (1949, 1950, 1951) for partition of chi square as programmed for the I.B.M. 650 and I.B.M. 704 computors by Thomas O'Brien. Some additional analyses were made using analysis of variance or t tests. In constructing the tables for chi square distributions on variables were split as close to the median as possible or, in the case of variables for which we suspected curviliniarity, into equal thirds.

Since there were few men in French and few women in Mathematics, analyses in which sex was a variable were usually made on the Psychology sample. Analyses for men were usually made for the Psychology and Mathematics courses, using Course as one of the variables. Similar analyses for women were made for the Psychology and French courses.

Results

Do the motives we studied make a difference in learning in differing classroom situations? Our results indicate that they do. But like most research results, they are not so clear-cut and consistent that no more work is necessary; in fact, we are trying to replicate them in another study now going on.[8] Nevertheless, the results do, I think, increase our understanding of the motives we measured and of classroom situations. Let us examine each motive in turn.

The Affiliation Motive

The affiliation motive as measured by the TAT is presumed to involve "concern with extablishing,maintaining or restoring a positive affective relationship with another person." We had hypothesized that students differing in affiliation motivation would be affected differentially by the "warmth" or friendliness of the instructor. This hypothesis was supported by a significant interaction between warmth and affiliation motivation (as measured by mean

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8. This is a study with Robert Isaacson and John Milholland under contract with the U.S. Office of Education. Members of the research staff have contributed materially to the thinking represented in this paper.

student perception) in determining grades for all students in spychology and for male students in both mathematics and psychology. None of the results for our other criteria were satistically significant. (See Table 1)

It is interesting to note, however, that in psychology, which was rated as the course providing the most affiliation cues, students high in need affiliation rated the course as being more valuable than students low in affiliation motivation. This difference was not found in the other courses.

Other interactions add intriguing complexities to this relationship. For example, we found that warmth also interacted with sex in determining grades. For women, warmth produced higher grades; men, on the other hand did more poorly in high warmth sections.

It is of course, difficult to know whether need affiliation scores for men and women are comparable. Nevertheless it is intriguing to speculate about the fact that on the pictures we used, the women's scores tend to be higher than those of men. Folklore also supports the notion that interpersonal relationships are more important to women than men. Thus it makes good sense that women should be favorable affected by affiliative cues. In fact, it may be that the somewhat weaker interactions between affiliation motivation and affiliative cues for women than for men are simply the results of a general feminine sensitivity to affiliation cues which tends to wash out the effects of individual differences in affiliation motivation in women. Offering support for this speculation is the fact that even the women low in affiliation motivation tended to prefer the classes with high affiliation cues.

Table 1

The Interaction of Warmth and the Affiliation Motive with Grades

Table 1A. Psychology Students Grades

Warmth	n. Aff.	A & B	C & D	
Hi	Hi	30	18	48
	Lo	17	31	48
Lo	Hi	17	27	44
	Lo	24	20	44
		88	96	184

Source	X2	df	p
n. Aff. X Warmth	0.0	1	
n. Aff. X Grade	.8	1	
Warmth X Grade	.1	1	
n. Aff. X Warmth X Grade	8.5	1	.01

This table is excerpted from a larger analysis including three other variables: sex, instrumentality, and intelligence.

Table 1B. Male Mathematics and Psychology Students Grades

Warmth	n. Aff.	A & B	C & D	
Hi	Hi	25	21	46
	Lo	10	21	31
Lo	Hi	17	33	50
	Lo	16	17	33
		68	92	160

Source	X2	df	p
n. Aff. X Warmth	.004	1	
n. Aff. X Grade	.153	1	
Warmth X Grade	.530	1	
Warmth X n.Aff. X Grade	5.2	1	.05

This table is excerpted from a larger analysis including the variables: intelligence, instrumentality, and course.

Recent studies of public school teachers by Cogan (1958) and by Ryans (1960) indicate that a dimension characterized by friendly, integrative affiliative nurturant behavior is important in public school teaching. Teachers high in this dimension produce more student/self-initiated work than teachers low in the dimension. Thus a similar teaching variable also appears to be important at other educational levels.

Need for Power

Let us now turn to the second of the motives for which we scored our TAT protocols--need for power. Veroff (1957) who developed the scoring system for power motivation, describes the power motive as that "disposition directing behavior toward satisfactions contingent upon the control of the means of influencing another person." He found that students who scored high in power motivation enjoyed leadership and recognition and were rated by instructors as high in argumentativeness and in frequency of trying to convince others of their point of view in the classroom.

One of the scores we had derived from our Bales-Mann observations was the proportion of student participations in discussion which were volunteered, rather than elicited by questions from the teacher. It seemed likely that a class in which the teacher encouraged students to volunteer their ideas freely would be one which would allow the student with high power motivation to attempt to convince others of his point of view and thus one in which he would be motivated. We thus hypothesized (weakly) that the student high in power motivation would achieve well in classes characterized by a high proportion of student volunteering. I characterize our hypothesis as "weak" because we were not confident that a student motivated for power would necessarily see study and academic achievement as instrumental to satisfaction of his motive.

The results relevant to these hypotheses were, however, encouraging. Male students high in power motivation do get better grades in classes in which student volunteering is prevalent than in classes in which it is uncommon. The converse is true for males low in power motivation. (See Table 2)

Interactions with intelligence are interesting. The opportunity to present one's own point of view is apparently most important for male students in the top half of our group in intelligance, for we find a significant interaction between student-assertive teaching and ACE in determining grades. Males low in intelligence do poorly in classes permitting a high degree of student assertiveness while high ACE students do well in such classes.

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Table 2

The Interaction of n. Power and Opportunity for Assertion in Determining Grades (all men).

Assertion	n. Power	Grades A & B	C & D	Total
Hi	Hi	25	30	55
	Lo	17	39	56
Lo	Hi	12	27	39
	Lo	19	22	41
		73	113	191

Source	X2	df	p
Assertion X n. Pow.	0.0	1	
Assertion X Grade	0.1	1	
n. Power X Grade	0.1	1	
Assertion X n. Pow. X Grade	3.9	1	.05

This table is taken from an analysis which included the variables of Course and ACE.

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As you have probably noted, I have said in each case "male students." These findings do not emerge for females. Perhaps power motivation is not emphasized as an important aspect of socialization for girls, or perhaps assertiveness is not a behavior instrumental to satisfaction of power motivation for women.

The interaction of student-assertive teaching with intelligence is consonant with similar findings in other studies of superior performance by able students in smaller, more permissively-led groups, (e.g. Ward 1956, Calvin, Hoffman, and Harden 1957) so that again we have some outside support for regarding this as an important dimension of teaching.

The Achievement Motive

The third motive which we studied is one familiar to Nebraska Symposium devotees through the papers of McClelland (1955) and Atkinson, (1954) - the achievement motive or n. Achievement. The very label, achievement motive, suggests that this motive should predict success in college. Many psychologists, however, have investigated the relationship between achievement motivation and grades with meager results. Atkinson (1958, pp. 605) accounts for this result by the suggestion that most behavior in everyday life is overdetermined; i.e. that a number of motives are engaged so that predictions on the basis of a measure of any one motive is inevitably weak.

Atkinsons reasoning and the research which supports it cannot be gainsaid. But despite our recognition of the low probability of positive results, we included a measure of the achievement motive in our research design. One reason for our hope was that some of the studies reporting low correlations between the test of achievement motive and grades have used product-moment correlations or other statistics appropriate for linear relationships. There is much evidence that need-achievement scores derived in the manner developed by McClelland and his associates are non-linear in their relationships with

Table 3

The Interaction of Intelligence and Opportunity for Assertion in Determining Grades (All men)

Assertion	ACE	Grades A & B	C & D	Total
Hi	Hi	30	31	61
	Lo	12	38	50
Lo	Hi	11	23	34
	Lo	20	26	46
		73	118	191

Source	X2	df	p
Assertion X ACE	3.4	1	
Assertion X Grade	0.1	1	
ACE X Grade	1.95	1	
Assertion X ACE X Grade	7.4	1	.01

many other variables. (Brown 1953, McClelland & Liberman 1949, McClelland, Atkinson, Clark, and Lowell 1953, pp. 269). If the relationship between need-achievement scores and grades is curvilinear, linear statistics would be unlikely to show the significance of the relationship.

But the more basic reason for reopening the question of the relationship between achievement motivation and grades is found in the rationale for this entire research program. If instructors differ in the cues they provide for motives, with affiliative cues dominant in some classrooms, achievement cues in other classrooms, and other cues in still others, the over-all grade-point average reflects a multiplicity of motive-arousing situations. Not only is achievement in any one class a goal for several motives and hence overdetermined in Atkinson's sense, but also in the grade-point average we are summarizing goal-achievement in situations differing in motive-arousal. Thus a low relationship between n.Ach. scores and over-all grade-point-average does not necessarily mean that n.Ach. may not be a useful predictive measure in individual classes.

Our hypotheses about the achievement motive and achievement were complex. (The results were even more complex.)

First of all, we expected sex differences. Most of the positive results from the TAT measurement of the achievement motive have derived from studies of men. Women's scores tend to be higher than men. In some respects, they seem to be continually achievement oriented rather than requiring achievement cues to activate motivation. (Veroff, Wilcox and Atkinson, 1953) Measures of intelligence predict grade point average better for women than for men (at least at Michigan). This suggests that women are more uniformly motivated for academic achievement than are men. We thus hypothesized an interaction between sex, achievement cues, and the achievement motive in determining grades. For men

our hypothesis was similar to those for the affiliation and power motives; i.e. that with more achievement cues, men high in achievement motivation would achieve better grades. For women on the other hand, we expected that the optimal conditions for students high in the Ach. motive would be in classes relatively low in achievement cues. Assuming that the Yerkes-Dodson law holds and that women are already at an optimal motivational level, we would expect an increase in achievement cues to result in a decrement in achievement.

A second complicating factor is that the measure of the achievement motive obtained from thematic apperception apparently is the resultant of two matives, one directed toward success, the other toward avoiding failure. Atkinson and Litwin (1960) have suggested that thematic apperception measures the motive to approach success while the Mandler-Sarason Test Anxiety Questionnaire measures the motive to avoid failure. O'Connor's results (1960) suggest that both scores represent interactions of the two motives. A low need-achievement score may indicate either a low need to achieve success or a strong need to avoid failure. Similarly a low anxiety score may represent low fear of failure, low need for success, or both.

With such ambiguities in the measures, you may well wonder why we used them at all. The answer is partly theoretical and partly simple curiosity. The body of theory developed by McClelland, Atkinson, and their associates is not only impressive in itself, but has been supported by a substantial corpus of research. It seemed to us that our investigation might help clarify the meaning of need for achievement and fear of failure. Adding fear of failure to the hypotheses we have already suggested, we predicted that the achievement of students high in fear of failure, as measured by the Achievement Anxiety Scale (Alpert & Haber 1960) would be higher in highly structured classrooms than in those where organization and structure were lacking. Let me explain our reasoning.

Whatever one's theoretical interpretation of the many studies relating anxiety to behavior, there is much evidence that a high level of anxiety is detrimental to complex learning or performance, (e.g. See Spence 1956, Sarason, 1960) and we would therefore expect students high in anxiety to perform poorly in college. But anxiety also affects performance on intelligence tests, so that Mandler and Sarason (1952) actually found students high in anxiety achieving higher grades than would have been predicted on the basis of their entrance tests. Their explanation is that the stress of entrance examinations is greater than that of achievement tests.

Anxiety is heightened by uncertainty; (Raphelson 1957, Sinha 1950); so we might expect the anxious person to have the most difficulty in classes where the instructor's organization is poor and the students have little awareness of where they are going and what will happen next. On the other hand, in a well-structured course where the path to achievement is clearly defined, we might expect anxiety to have positive effects.[9] Atkinson (1958, pp. 329) has suggested that in a constrained situation which the anxious person cannot avoid, his performance will be similar to that of the individual with high positive motivation for achievement.

Analysis of our data revealed significant interactions of the sort predicted but interactions which are not easily interpretable. For example, in psychology, achievement cues and the achievement motive interact in determining grades. But it is the group who score in the mid third of the distribution of n. Ach. scores who do best in the sections presenting fewer achievement cues. This is not unreasonable if this is a group high in fear of failure as suggested by Grown (1953), McClelland and Liberman (1949), and McClelland, Atkinson, Clark and Lowell (1953). One would theorize that as achievement cues are increased

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9. Isaacson suggests that increased structure may simply make the cues to anxiety more apparent and affect performance detrimentally.

such students perform less well because they adopt defensive avoidance behaviors such as daydreaming or leaving the examination early as described by Atkinson and Litwin.

Unfortunately this relationship does not hold for the other courses. We do get a significant interaction between achievement cues and n. Ach. in determining grades, but it is the high n. Ach. students who do best in lo cue sections. (See Table 4) In fact the group for whom the difference is greatest is the men in the top third of the n. Ach. distribution whose mean grade is 2.1 in the high cue sections and 2.6 in the low cue sections.

You will recall that we expected sex differences. These emerged in a significant three-way interaction between achievement cues, sex, and their need-achievement in predicting grades in psychology. Here, as we expected, men high in n. Achievement did poorly in sections low in achievement cues. Women high in n. Ach. did relatively better in low cue than in high cue sections. These interactions did not prove to be significant in other courses, but there was a significant interaction between achievement cues and sex, with men generally doing better in low cue sections than in sections high in cues for achievement while for women the differences were slight. Actually the interaction between Course, Sex, Achievement cues and Grades is also statistically significant. In Psychology the men do better in the high cue sections.

Ratings of course value indicate that both men and women high in the achievement motive prefer the classes with a low level of achievement cues; and students scoring low in n. Ach. rate the high cue sections as more valuable.

Thus Psychology seems to be a maverick in these analyses, although results in the Psychology course make sense in terms of our original hypotheses. Even with the deviant Psychology course included, however, we find that over-all the student with a high need for achievement does best in the sections with fewer achievement cues.

Table 4

The Interaction of Achievement Cues and the Achievement Motive in Determining Grades (All Students)

Ach. Cues	Ach. Motive	Grades A & B	Grades C & D	Total
High	Hi	68	82	150
	Lo	70	83	153
Lo	Hi	82	56	138
	Lo	58	84	142
		278	305	583

Source	X2	df	p
Ach. cues X n. Ach.	0.0	1	
Ach. cues X Grades	1.2	1	
n. Ach. X Grades	4.4	1	.05
Ach. cues X n. Ach. X Grades	5.3	1	.05

The simplest explanation of this in terms of our Yerkes-Dodson type of theorizing would be to suggest that there are enough cues in even the low cue sections to elicit the motivation of the student high in n. Achievement, and an increase in cues carried such students beyond the optimal level of motivation. An even more parsemonious explanation might be to suggest that the high n. Ach. student was motivated in the low cue sections, and the effect of higher achievement cues was simply to get the low n. Ach. students motivated so that the high n. Ach. students faced rougher competition.

I must admit that while embracing the soldi virtues of parsimony, I have sometimes cast a wistful eye on the charms of fancy. So permit me to propose a third possible interpretation.

I would begin by distinguishing between extrinsic and intrinsic rewards for achievement. For the student with high intrinsic motivation, rewards for achievement are internalized so that when he is placed in a situation where the task involves some competitive standard of achievement, he is motivated to do well and receives satisfaction when his achievement approaches or reaches his level of aspiration. Other students, however, may be dependent upon extrinsic rewards for achievement. Grades, praise, or some other form of recognition may be necessary for them to be motivated.

What happens to these two types of students in a situation in which the extrinsic rewards are emphasized? I would suggest that both types of students continue to work, but that for the intrinsically motivated student some of the zest is gone. Why is it that we sometimes refuse pay for a good deed we have done? Because the pay would rob us of the good feeling we gain from enhancing our own self-image.

Something of this sort may have happened in our study. In the sections characterized as strong in achievement cues, I suspect that the extrinsic

rewards were prominent and that the student high in intrinsic achievement motivation may have felt driven. President Victor Butterfield of Wesleyan University has suggested [10] that these conditions may, in fact, actually break down intrinsic motivation. He believes that lack of curiosity and internalized motivation for learning is often the result of years of teaching which has so emphasized extrinsic incentives that the student has few opportunities for finding intrinsic satisfactions.

One of the allurements of this explanation is that it can handle the troublesome divergencies of the Psychology course. Although the Psychology course did not differ from the other courses in achievement cues, it was taught in a more permissine manner as measured by our student assertion index. Thus in Psychology we might expect a greater opportunity for intrinsic motivation to find satisfaction even in the sections with many achievement cues.

Now let us turn to the complications introduced by our attempt to measure fear of failure by an anxiety measure. You will recall that our basic hypothesis was that students high in achievement anxiety would perform better in highly structured than in less-structured classes.

At the simplest level our results do not support this hypothesis, although there is some support in student ratings of course value. In psychology, students rated the classes with a high degree of structure as more valuable than those low in structure and there was a significant interaction between structure and anxiety with the more anxious students differentiating more clearly in their perference for sections with a high degree of structure.

Some rather puzzling higher order interactions emerge. For example, there is a significant triple interaction between structure, sex, and anxiety in determining grades. (See Table 5) Hi anxiety women do well in highly structured

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10. Personal communication.

classes and poorly in low structure as predicted. For men, however, it seems to be the classes with moderate structure which affect men high and low in anxitey differentially with high anxiety men doing badly and low anxiety men doing well in such classes. To add to the confusion, the men in the mid-third of the distribution of anxiety scores achieve higher grades in highly structured sections than in less structured sections. This interaction simply confuses me.

These results do not seem consistent with one bit of previous research, a study by Elizabeth French in which four man groups in which all four men were high in n. Ach. performed better when given task relevant feedback than they did when given group atmosphere feedback.

Our most intriguing results come from the interactions of achievement motivation and anxiety with the degree to which the instructor made the steps to a good grade clear by announcing tests in class and indicating when student comments were right or wrong. We called this the "feedback" dimension. This dimension showed no interactions with anxiety alone, but was involved in a significant four-way interaction with sex, achievement motivation, and anxiety in determining both grades and ratings of the value of the psychology course. To illustrate its complexity, let me point out some of the extreme cells.

Students who are high in achievement motivation and low in anxiety received higher grades in sections low on the feedback dimension than in high sections and their ratings of the value of the course are in the same direction. Female students low in achievement motivation and low in anxiety didn't like and don't do well in sections low in feedback. Males low in achievement motivation and low in anxiety did very well in sections high in feedback but rated the value of the course low.

Table 5

The Interaction of Teaching Structure, Student Anxiety, and Sex in Determining Grades (all students).

Sex	Anxiety	Mean Grades Structure		
		Hi	Mid	Lo
Male	Hi	2.2	1.3	2.3
	Mid	2.7	2.2	1.7
	Lo	2.7	2.8	2.5
Female	Hi	3.0	2.5	2.0
	Mid	2.3	2.5	2.8
	Lo	3.3	2.7	3.0

N = 108

F = 2.8

df = 4 and 54

p = .05

The other variable included in this analysis of variance was Course, (Math, Psychology, French).

These results seem to fit my fanciful ideas about extrinsic vs. intrinsic rewards. The high feedback section seems to me to be one where extrinsic rewards and punishments are stressed. The performance of the high n. Ach., low anxiety student fits my conception that a student with a positive internalized motive, will do best in a situation where intrinsic rather than extrinsic rewards are maximized. The low-low students on the other hand may be characterized as possessing weak intrinsic motives and hence requiring more extrinsic pushes and pulls. Admittedly any interpretations of such complex interactions are pretty shaky, but it's fun trying.

Conclusions

What do these results add up to?

To the obviously biased researcher, they add up to support for the original idea that teaching methods interact with student motives in determining the outcomes of education. Certainly the amount of variance which may be accounted for by anyone of our present variables is not great, but it is significant.

A related conviction which has been strengthened by these results is that we need to make much greater use of multivariate analyses in our research. I must admit that I have difficulty interpreting some of the higher order interactions emerging from our analyses; moreover, I'm not sure that I trust them. Nevertheless, I believe that those of us doing research in social and educational psychology, particularly in naturalistic settings, have been in much the same position as the biologist before the discovery of the microscope. When we use more powerful analytic tools, we may like Van Leewenhork first be awed by the "Wee beasties" which swim up out of the murky placidity of our simple "no significant-difference" studies. But in the long run, I am sure that we will develop the theoretical tools necessary to comprehend what we find.

Next I would point to the support for using individual difference variables as a key to the identification of important social psychological or educational dimensions. Undoubtedly there are social psychological variables which have uniform effects upon all sorts of people, but our progress in extending a list of these has been frustratingly slow, and I suspect that one reason for this is that dimensions keyed to differences between roles and individuals may be both more numerous and more powerful in predicting behavior in many social situations.

Finally I am relatively pleased with the outcomes in relation to our original problem of identifying important human motives in education. Those we chose were certainly not picked out of a hat, but their usefulness in an educational situation was somewhat doubtful, particularly when we considered the relatively low reliability of the best measures that were available. My regard for McClelland, Atkinson, Heyns, Veroff and their associates is enhanced by finding that their variables and measures really do work--not as well as I should like, but at least enough to reinforce my own need for achievement.

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